

The Impact of Comets and Asteroids Upon the Earth

D. K. Yeomans (JPL/Caltech)

Comets and asteroids have been receiving bad press of late. In two recent movies, they have been portrayed as Earth threatening villains. While comets and asteroids do smack into the Earth from time to time, it is also likely that they helped deliver the water and carbon-based molecules to the early Earth, thus providing the building blocks for the formation of life. Subsequent collisions may have punctuated life's evolutionary cycles allowing only the most adaptable species to evolve further. We mammals may owe our preeminent position atop the Earth's food chain to a collision some 65 million years ago that wiped out most of our competition - including the dinosaurs.

Ironically, the same comets and asteroids that can most closely approach the Earth are also the most accessible in terms of exploiting their vast supplies of water and metals. Comets and asteroids could supply the raw materials necessary for colonizing the inner solar system in the next century.

In addition to the utility of assessing their potential as future threats and resources, there are compelling scientific reasons for studying these primitive leftovers from the solar system formation process. Knowledge of their compositions and structures will provide important clues to the conditions and chemical mix from which the planets formed some 4.6 billion years ago. The nature and chemical composition of these enigmatic objects should soon become clear as spacecraft missions closely study a dozen comets and asteroids in the next 13 years.